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Church Lighting a Neglected Opportunity

The Way to Sell Gas Lighting to Churches Is Not to Talk Convenience and Cheapness, but Good Lighting

By J. E. BULLARD

In some quarters we hear a great deal about the church not holding its own. We are told that church attendance is not keeping pace with the growth in population. Many reasons are given for this, but there is one reason that is rarely given the attention that it deserves.

A poorly lighted church will never attract the congregations that the same church and the same clergyman would attract if that church were better lighted. There are a great many people who stay away from church because the church is not properly lighted, but few of these people realize that the lighting is the real reason why they do remain away.

When there are lights shining into one's eyes they either cause one to go to sleep or at least detract from the interest of the sermon. Also, if there are bright lights shining into the eyes of the minister he is not able to put forth his best efforts.

In the theater the actors and actresses are aided by the use of light. In the church, light is far too often used in such a manner as to become an obstacle in the way of the man who preaches. The result is that the theater is advantaged as compared to the church in the ability to attract attendance.

Gas the Ideal

Of the modern illuminants, there is none better suited to the requirements of church lighting than gas. It is not convenience of control that is needed so much in church lighting as a system that is easy on the eyes, one that will not put the congregation to sleep and one which will not irritate the nerves of the preacher to such an extent that he is unable to give the congregation the best that is in him.

There are some ministers and there are some congregations that realize this. It is safe to say, however, that these are in the minority. If there were enough who did realize it we would find that a good course in illuminating engineering would be one of the required courses in every theological school.

The way to sell gas lighting to churches is not to talk convenience and cheapness, but good lighting. It must be pointed out to the church folks that only through good lighting will the church be able to accomplish the very best results. It is usually not especially difficult to show them that glaring lights have a very bad effect upon the spiritual effect of the sermon, and that they also have a bad effect upon the size of the collection. Every church is interested in both of these effects. The poorer lighting they have used in the past the more likely they are to weigh heavily the collection appeal.

"Cheap" Talk Paves the Way to Dissatisfaction

H. C. Thomson, a salesman for the Welsbach Company in Providence, R. I., realizes that this is true. Accordingly, he keeps an eye on the churches. He does not wait until a church has installed a lighting system before he gets busy. He endeavors to get there first and to show the building committee and the minister the value of good lighting.

This was the reason why he was able, recently, to install some semi-indirect gas lamps in the Wesleyan Pentecostal Church at Providence. This is a new church. It is located in a building that had been used by another church association, was sold and used as a ward room, and which they purchased and again remodeled for their use as a church.

Mr. Thomson avoided the argument of convenience and cheapness. He says that the way to sell gas lighting is to sell good lighting. If people get good lighting it does not make so much difference to them whether they use gas or electricity. So all that is necessary is to show that the best lighting is gas lighting.

There is one very great advantage in proceeding along this course. If you talk cheapness the con-

sumer must wait a month or several months to determine whether or not the lighting really proves to be cheap. All the time he is watching the cost, and if by chance he uses more than usual some month he is likely to forget this fact and to make a high-bill complaint. Cheap talk, therefore, paves the way for dissatisfaction.

If you talk convenience, the first time anything goes wrong with the equipment that you have installed to add convenience the consumer is going to decide that gas lighting is not very convenient after all. He is all the time looking for disadvantages. He knows from experience that gas as a usual thing is not as convenient as electricity. He is, therefore, more than half sold on the desirability of electricity before he makes up his mind finally that gas is not convenient.

When it comes to good lighting, however, gas lighting stands alone. It is soft, it is of a pleasing color, and it is pleasant and cheerful. It has more life and optimism in it than has the cold, penetrating electric light.

Making Good the Moment the Installation Is Put Into Operation

Also, when you sell gas lighting on the basis of good lighting, and of good lighting alone, you can demonstrate that the installation has made good the moment that the lighting system is put into operation. You don't have to wait until the enthusiasm you have aroused has cooled off. You can increase that enthusiasm by showing what a fine lighting effect the installation gives.

This was the way in which Mr. Thomson sold this installation of semi-indirect gas lighting to this church. He talked nothing but good lighting; he showed the people interested how much the success of the church depended upon good lighting, and then when the installation was made and the gas was turned on he clinched his sale.

Selling Them After the Installation Is Made

He went to this church and proved, by means of the lights themselves, that every claim he had made was made good. He demonstrated to them what a perfect lighting system they had. He took a hymn book and had some of the church people take hymn books and stand or sit in different parts of the church and read the hymn books. This showed them that the lighting was good. He showed them that there was no light shining directly into the eyes of anyone. He showed them how soft and pleasing the light proved to be. In fact, he sold them the installation in a very thorough manner after it was made.

The mistake that a great many gas salesmen make is in not following up their installation and seeing to it that the consumer is thoroughly sold. Unless this is done some competitor may come around and point out the weak points. If it is done the consumer is going to be convinced that gas lighting is the best lighting and the arguments of the competitor will have less weight.

THE WESLEYAN PENTECOSTAL CHURCH AT PROVIDENCE, R. I., SHOWING THE INSTALLATION OF SEMI-INDIRECT GAS LAMPS

THOSE "SOLD" HELP SELL OTHERS

How successful such a practice is in selling any kind of goods is illustrated by a concern that sells domestic laundry equipment. This concern rarely sends a representative to make a personal call until after the sale is actually made. He does all the preliminary selling over the telephone. After the sale is made, however, he sends a man to make the installation and to demonstrate the machines. In the course of the demonstration this man clinches the sale. He arouses the enthusiasm of the purchaser for the machine, and as a result all this concern's customers are frequently sending in the names and telephone numbers of new prospects. It is in following up the sales that the real profit of this concern lies.

In the case of this church lighting installation we find the same results. One Sunday evening soon after the installation was made Mr. Thomson attended the church. After the service was over he talked with the minister and asked him what he thought of the lighting system. The minister replied that he had preached in a great many churches, but never yet had he preached in one where it was so easy to preach at night as in this one. He pronounced the lighting system as the most perfect that he had seen in any church.

It is easy to see what effect this degree of satisfaction will have upon the members of the church. Sooner or later many of them will want gas lighting similar to this in their homes. They have been thoroughly sold on gas lighting. Though the church is small, having a floor about 45 by 65 ft., and only five lighting units are used, a lighting installation of this sort is far more important in the cause of gas lighting than its size indicates. It is a constant demonstration of good lighting and it is a demonstration of how good gas lighting can be made.

The lights are hung 14 ft. from the floor and the valves are operated by means of pull chains, another indication that the installation was sold on a good lighting basis. In addition to the semi-indirect units, there are a couple of side lights back of the pulpit. This installation indicates that if enough attention is given to the good lighting qualities of gas lighting it will not be necessary to install any remote control devices in a church. After all, why should remote controls be used? The gas is lighted before the people arrive and there is no good reason why the intensity of the light in most churches should be varied at any time from the arrival to the departure of the people in the congregation.

How a Slag Hole in a Cylindrical Retort Casting Was Filled in as Good as New

Reclamation work for the oxy-acetylene welder in the iron foundry is not confined alone to welding broken castings. It is easily within his power to save castings that are defective in many other ways. He can make castings as good as new out of many that seem to be hopelessly lost through errors in molding, casting or machining. If he possesses a fair amount of knowledge of the welder's art, coupled with a little ingenuity and skill, there is scarcely a defective casting which he may not remedy. And in most cases the work can be done at a considerable saving over the cost of recasting the job. In some instances, where the welding cost is large, the time saved will more than balance the cost of welding. There are always instances in any jobbing foundry when the factor of time is more important than the first cost of the casting; it is here the welder can prove his worth, for "hurry-up" jobs are his own game. He is "long" on repairing things in a hurry.

The following is a description, written by David Baxter in the Acetylene Journal, of how a defective casting was successfully mended, ready to be sent through the regular channels to the machine department to be finished, as good as if the defect had never happened.

The casting was a hollow cylindrical retort, weighing about 500 lb. In length it measured approximately 4 ft., with a diameter of about 14 in. One end was solid, while the other had a round opening 2 in. across. The metal thickness in the wall was in the neighborhood of 2 in. This shape and weight combined to make the job an awkward one to handle, especially while hot. However, there was little of this to do except to roll it upon the ground when welding.

The slag in the defective spot extended to a depth of an inch in some portions. It consisted of a mixture of dross from the cupola furnace, part of which was very tough and sticky when in a melted state. Part of it was spongy and was connected to the casting by threads of metal, so that little of it could be knocked out with a hammer and chisel. But all of the dross had to be removed before filling the spot with new metal.

The spines protruding from the sides of the casting were what are termed chaplets and were employed to hold the inner core in place while the metal was poured into the mold. These spikes were partially melted by the metal, so that they really formed a part of the casting; the core formed the hollow part.

The first thing to do was to prepare the defect for welding or filling. This was done by cutting away as much of the slag and rough metal as it was possible to do with a sledge and handle chisel. This cutting was done only to the point where it became a time consumer; when it was no longer possible to cut the slag out rapidly and easily with the chisel it was abandoned. The remainder must then be removed with the torch.

Before doing this the whole spot and 6 or 8 in. of the surrounding casting were heated red-hot with an air pressure oil burner, for the purpose of saving gas and to cut the time of melting. It was accomplished by placing th casting upon its side and directing the flame of the oil burner in such way as would cause the flame to spread to both sides of the cylinder. Sheets of corrugated iron were placed around the preheater to confine and conserve the heat.

While the job was heating, the welder brought a portable welding outfit, which is probably the best for all-around foundry service, since it may be taken to any job anywhere. A heavy duty torch with a long extension was attached and fitted with a large welding tip. No cutting torch was used, because it is of no avail on cast iron. However, the welder regulated the flame with a slight excess of oxygen, which gave him more power and yet could do no harm to the metal while removing the dross.

After attending to the regulators and making certain there was a good supply of welding gases, the welder regulated the flame as stated and applied it to

the slaggy spot, which had by this time heated to a bright-red stage. The high-power flame was then moved around in a small circle near one end of the defect. As soon as a portion became melted it was scraped out with a special tool made of a flat bar of iron bent hoe-shape at one end. Several of these scrapers were at hand, so that as soon as one was clogged it was replaced with another one, while the welder's helper cleaned the first one by hammering it on a block of iron as soon as the metal started to congeal. A clean skimmer was always at hand so the welder need not interrupt the melting process.

The whole spot was cleaned out by melting and scraping a little at a time. As much of it was kept in a molten state all the time as it was within the capacity of the torch to do. Enough of the edges and bottom of the defect was removed to be certain that no slag remained. In doing this the casting was rolled from side to side to permit the stuff to be scraped downward, which made the work easier. The oil preheater being in operation all the time, sheets of asbestos paper were arranged to protect the operator as much as possible.

After the whole spot was apparently clean the welding flame was passed over the surface again, bringing it to a melting state, meanwhile keeping a close watch for signs of slag that might have been overlooked in the first operation. Whenever the flame bored easily into the metal a bit of slag would be disclosed and removed. The slag floated quite easily in so much melted metal. The casting had to be leakproof, so every bit of slag had to be removed before welding.

When at last the hole was clean the job was rolled over until the defective portion stood directly upward; this for the purpose of making it more easy to weld, with no tendency of the filler metal to run out of the hole. This was done while the casting was yet hot from the first preheating in order to save as much time and preheater fuel as possible. Then the oil heater was rearranged to keep the end of the casting hot while the defect was filled.

First, the lowest portions in the scraped place were attacked. The same high-power flame was sprayed around over the spot in a circle about 2 in. in diameter. When this started to melt a heavy filler rod was brought in contact and heated with the welding flame until both the casting and the filler flowed together. The flame was kept revolving over the melting casting while the filler was twisted and churned into it, literally pushing the new metal into the weld. When the first low spot was full the flame was passed to another to treat it in a like manner. All of the low spots were filled, one at a time, until the bottom of the scraped portion smoothly sloped to the surrounding casting. During the process a patent flux was liberally supplied by dipping the melting end of the filler rod in a pot of it, returning it quickly to the weld. The flux was liberally used during the whole process of filling.

The last part of the shallow hole was filled in much the same manner as the first, except that the filler was laid across the bottom of the cavity a layer at a time instead of in unconnected pools. The rod was handled in a more or less horizontal position; instead of churning up and down it was moved back and forth across the weld. The welding flame was moved back and forth along the rod, bringing it to a flowing state in unison with a portion of the casting beside it. By manipulation of the flame and filler the welder made the operation almost continuous; the rod, the hole and an advance portion of the weld were heated simultaneously. So that as soon as one portion was filled an adjoining spot was nearly ready to receive the filler. Thus a layer perhaps half an inch thick was fused over the entire surface of the hollow. Then the weld was doubled back across the weld to add the last layer. This layer was composed practically of pieces of filler rod welded side by side across the defect. In effect this is what was done; however, each piece was thoroughly melted and mixed with the preceding one. Also, great care was taken to see that the filler was properly fused to the metal beneath it. The metal was melted deep enough that there could be no misconnected portions.

When the last layer had been added the welder worked back across the whole surface again. Every inch was remelted and prodded with the melting end of the filler rod, in effect knitting and kneading the whole thing. This was for the purpose of detecting any weak spots; also to detect for removal any burned or slaggy portion. The bad spots were broken up and churned to the top, where they were removed.

While doing this a surplus of metal was added on the weld to insure the removal of surface impurities when the weld was ground off. If there are any slag holes or blow holes in a heavy weld they usually occur near the surface, so that it is often best to add quite a bit of extra metal on top of the weld. When it is machined off there is a good chance that the metal level with the casting will be clean; at least the number of bad spots will be minimized. Impurities, both gaseous and solid, tend to rise to the surface of melted metal; the hotter and the more fluid the metal the easier it is for the dross to float. This fact is well known to the foundrymen. All welders will do well to take heed of it, too.

Therefore the welds on cast iron should be as hot and fluid as is permissible without endangering the metal to burning. When the metal is white and fluid the flame should be drawn back; when the melted metal is white-hot no more heat should be applied. However, this condition should be brought about slowly in order to get a proper depth of weld. The meaning of the depth of weld might be well illustrated by the analogy of pouring water upon the ground. Water poured upon the ground soaks into it; if it is poured slowly it soaks deeper; if poured too rapidly it runs off or washes out part of the ground without moistening very deep. The same is true of the flame if it is held close and fiercely to the metal it will melt rapidly and destroy part of the metal. while if it is brought in contact slowly or moved toward the metal slowly it will soak in deeper without danger of destroying the life of the iron.

In order not to make the process too slow the flame is held close to the iron, but is kept in constant motion working back and forth across the surface, or round and round in circles. This gives the effect of keeping the flame away from the iron and still permits the heat to soak in deeper. It permits the handling of larger quantities or the covering of greater surface area.

During the entire welding of the defective casting the welder endeavored to employ a method like the soaking method, especially the latter part of the weld. The heat was soaked into the metal when adding the

surface stock. He was careful to not carry it to extremes, though, since the quality of cast iron is altered with every successive remelting. For this reason he required the filler rods be made of soft pig iron to replenish the quality of the metal in the casting when making the weld.

It might be well here to caution foundrymen who contemplate making their own filler rods to use a good grade of high silicon pig iron for the purpose. Common scrap iron will probably recast too hard for good filler rods. And, too, he should cast them in two-part soft molds, because the rods cast in molds where the pattern is pulled out endwise are too hard. Pulling the patterns endwise causes the mold to leave a slick, hard surface which has a chilling effect upon the rods, causing them to be hard, with a marked inclination to be brittle. This is probably the reason why so many foundries fail to produce soft cast-iron fillers, especially those of small diameter.

But to revert to the defective casting. After the surplus metal layer had been added the casting was permitted to cool. This part of the repairing required no particular attention; the job was merely covered to cool slowly where it lay. The weight and shape made cracking unlikely especially as the whole end of the article was red hot and therefore could contract evenly.

After the casting was cleaned and chipped in the customary foundry manner it was sent through the regular channels to the machine department to be finished as good as if the defect had never happened.

Now if casting if this cize can be remedied it stands to reason that larger and even more defective jobs can be handled too. It means merely a matter of taking time to melt and fuse the filler metal into the cavities, after first thoroughly cleaning them. Or, where the metal is not too thick the defective portion might be cut out with the torch by the melting and scraping methods, then casting a new section and welding it in place of the defective one. There are undoubtedly instances where it will not be necessary to be so particular about removing all of the slag from the defective part; only enough need be removed to leave an anchorage for the filler metal.

Depth of Casing Alone in Cementation Is Not at All Indicative of the Burden It Will Carry

A Few of the Causes for Failure in Carburization Enumerated—Wherein the Commercial Phase Must Be Considered to a Degree That Rivals Respect in Which Underlying Theories Are Held

Research as applied to the science of cementation has a tendency to forget that the commercial side is of paramount importance, declared J. E. Burns in a paper before the Indianapolis section of the Steel Treating Research Society. Science should bear to cementation only the relation it ought to bear for the commercial advancement of the individual. Determinations in this respect are right or wrong only according to the purpose with which they are approached. From the theoretic correct, they are in error; from the commercial viewpoint, they are but correct. To take such radical stands is rather impertinent, especially when in direct rebuttal to known and recognized authority; but becomes most noteworthy when the commercial value of such action is considered. The theoretically correct application of science, irrespective of cost in commercial enterprises, is dangerous; but a radical knowledge that will meet conditions, with positive known costs, is organizing.

Some time ago I was discussing the many phases that enter into the application of cementation with a man whose knowledge I greatly respect, and he took exception to the suggestion offered for reason of a positive knowledge contrary to the advices I advanced. Later, when he was identified with the subject of costs, I had the privilege of discussing the subject again, and I pointed out that the explanation of his condition was to be found in the information I offered at the time he took exception to my advices. This information then became a value instead of a radical utterance on my part. However, I do not wish to convey the impression that I forget the value of theory underlying the science, for without these fundamentals little could be accomplished. But I do believe that the true value of science is and can only be estimated by its value commercially.

The science of cementation is so universally well established that it is the seeming little things of no importance that really develop into the bigger things. However, I will endeavor to give my viewpoints of making determinations that are in accord with the theoretic correct.

Nature of Carburizing Material of Vital Importance

First, let us take the question of cement used for the purpose of cementation; or carburizing, more commonly called. The nature of carburizing material used is of vital importance, as it is well known that pure carbon in a vacuum acts solely by its solution in the iron with which it is in contact. The character and the origin of the carbon, whether mineral or organic, is of paramount importance in determining its value in cementation. Graphitic or mineral carbon has a far less value than amorphous or organic carbon—and the finer the particles the better.

The kind and character of gases generated is of importance in the rate and uniformity of carburization. The gases in order of their efficiency are: CN_2, CN, HN and CO. That this is the opinion of the theoretic can be confirmed by any standard work on the metallurgy of steel. Harbord's "Metallurgy" (page 227) says: "It is desirable that carburization

should yield hydrocarbon vapor." Lewis, famous in the Sheffield district, says, in the Iron Masters' Association: "The character of the carbon is of importance. Mineral carbon as graphite is valueless. Powdered charcoal is used, but its value depends chiefly upon the volatile matter it carries." In fact, it may be said the controlling factor in cementation lies in the gaseous form of carbon that it develops. Cyanogen and hydrocarbon gases are the most efficient, and CO is of value. CO_2 may be positively injurious. Charcoal alone with catalytic agents has so many disadvantages as a carburizing agent that it cannot be successfully used where maximum conditions are desired. Due to its affinity for oxygen and generating heat, it catches fire spontaneously, and when used for cementation it generates uncontrollable temperatures, with resulting unsatisfactory condition in work treated, for the reason that temperature controls the percentage of carbon deposited in the steel.

Examinations of pieces treated in an agent of this character developed upon analysis 1.60 carbon on surface, which is entirely too high for industrial purposes.

This character of material cannot be used successfully for long heats, as it exhausts itself very readily and generates a CO_2 gas, which is detrimental and a source of decarburized work.

Bloxham Metals (page 99) says: "All carbonaceous substances are not equally efficacious for cementation. Mineral carbon is of little value. Wood charcoal does not answer as well as that obtained from bone or horn, and that the carbonaceous material which will generate cyanogen or hydrocarbon gases will yield the best and most uniform results."

The question of thermal conductivity is of importance in determining the value of a carburizing material. Benedick's "Recherces Physiques Sur Les Aciers" says: "The more dense the carbon the greater the absorption of heat, and hence the lower thermal conductivity." This may be to an extent measured by the calorific values of several forms of carbon. These are: Sugar carbon, 8,090; wood charcoal, 8,080; gas carbon, 8,027; coke carbon, 7,790; native graphite, 7,787; artificial graphite, 7,762.

As far as volatile matter is concerned, it can be made up in part or in whole of the following gases: CN gas, Olefiant gases, CO, CO_2 and CH, these generating according to the character of volatile matter used.

The fixed carbon value is of importance. Fixed carbon of a character that will not liberate active gases is of no consequence; and while analysis will determine a carbon content, if of mineral or graphitic form, it is not to be recommended.

Detailed Research Not Essential Industrially

My reason for going so thoroughly into the question of cementation at this time is because this phase of cementation, to my mind, is not sufficiently well established as a fact to be considered one of the positive known fundamentals; and I have quoted the forementioned authorities for confirmation of my beliefs, with hopes that those interested may be able to make a determination when confronted with having to make a decision. I hazard the opinion that with all fundamentals well established the successful application of the science of cementation comes within the scope of the average individual interested in the art—this without devoting his entire time and energy in research.

Microscopic photography has been so well advanced and characters and steel structures so well known that it is a comparatively easy matter for the individual to safeguard his interests at all times and analyze his troubles with the aid of the microscope. Knowing these fundamentals, it is quite apparent that detailed research is not essential industrially. In order to secure these fundamentals facts must first be established and taken as a positive basis for operations.

The thermal phases of cementation seem to be so universally well established that I won't endeavor at this time to take up that point.

Physical Specifications of Tremendous Importance

The question of physical specifications is of tremendous importance in this science when considered commercially. Specifications determined arbitrarily are not in accord with modern metallurgical engineering and often prove very costly. A concrete example of this condition was recently unearthed in one of the largest corporations in America, where it was found the specifications as determined by the engineering department on certain work of large production called for a penetration of 1/8 in., where subsequent tests proved 2/32 in. to be amply sufficient. The saving effected by the reduced depth of case and time necessary to produce the greater depth amounted to large figures.

The thought may occur, How can such facts be proven? Test specimens for all classes of work should be made at gradually increased depths and subjected to working conditions. However, the depth alone of the case is not at all indicative of the burden it will carry. If of a cementitic structure and graphitic in form, it is useless for heavy duty at any depth. The specimens meeting conditions, produced at a nominal cost, should then be adopted and standardized to a known method for physical properties. All subsequent work produced should then be checked to this known method—and a uniform product is assured.

Authorities generally agree that the carbon content of case should only in exceptional cases exceed 90-point carbon, or the eutectoid zone, for finished work. Where allowances are made for grinding, for every one-thousandth allowed 0.01 carbon can be generated in excess of the eutectoid zone; and when grinding is effected, the decrease in the carbon content of the case will be in direct proportion to the amount, in thousandths, ground off.

Causes for Failure

I believe it well at this time to enumerate a few of the more apparent causes for failure in the application of cementation:

Soft Spots.—Investigation of this condition usually develops the trouble due to incorrect application of the thermal treatment; and examinations usually prove this by showing pearlitic rather than martensitic structure. This, however, is not the only cause for this condition. Carburizing material generating CO_2 gas oxidizes iron energetically. It is well known that carbon dioxide (CO_2) produces ferric oxide—producing this condition—soft spots.

Weakness, or Brittleness.—Another source of complaint. This can be caused by the use of poor cement, high in sulphur, combining with manganese and iron into sulphides not in solution, or by lack of proper treatment after carburization. All work after carburizing is naturally in a crystalline and weakened condition, and must be subjected to regenerative treatment in order to restore or produce the maximum condition.

Enfoliation, or Spawling.—The source of this trouble is usually found between the hyper-eutectoid and the eutectoid zones. Free carbon in the form of cementite out of solution, having no affinity or homogenity for carbon in solid solution, relieves itself upon shock at this point. Temperature control is usually the rectification for this trouble, although it is common for this trouble to develop with the use of nonuniform cement where the spawling develops at the extreme limits of the case, or often in the hypo-eutectoid zone.

The Carbonization of Coal Stands Out Preeminently as the Efficient Method of Extracting Its Greatest Thermal and Chemical Values

The last word on the subject of coal carbonization with all the subsidiary processes to utilize to the full the products which result from distillation out of contact of air, has not by any means yet been heard. The possibilities of this method of treatment of coal prior to its utilization as a source of heat are so wide, and its application to other types of fuel of widely differing characteristics so probable, that it is not a matter of surprise that new methods claiming special advantages should from time to time be forthcoming. Claims for improved methods are readily made, but the solution of the fuel problem must indubitably be bound up with such a large scale demonstration before highly competent judges as will leave absolutely no room for doubt as to the efficacy of any system of procedure which may be proposed.

In Great Britain, various systems of distillation have been under large-scale experimental investigation, for a number of years, but the importance and urgency of the matter has never been sufficiently realized by the large body of men responsible for the conservation of that nation's fuel resources, until the comparatively recent appointment of the Fuel Research Board, which was directed to investigate the problem in all its bearings. Such an investigation must necessarily involve considerable time, and when issued, the final report of this board must constitute a document of an epoch-making character in the annals of industrial fuel research. Pending this investigation, the problem was left to individual interest and enterprise. Modifications of no mean order have been introduced into long established systems of carbonization. The now well known developments in by-product coking and the modern changes in gas works practice are illustrative of this progress. In these industries a definite forward policy has been adopted, except where and when the restrictions of coal, both in quantity and quality have definitely hindered. Other methods, too, of conserving the intrinsic value of coal and incidentally meeting the demands of other industries for raw material, of which abundant supplies are forthcoming from coal, have been under investigation, and Great Britain is now reaching that important point in the history of fuel research when the discoveries of patient workers over a long period may be expected to materialize in the reorganization of the whole of the methods of consuming the raw material with which Nature has so abundantly endowed, but which has, nevertheless, been squandered with unpardonable prodigality. The call for a halt has come.

Schemes for the treatment of coal by carbonization must needs be variable according to the class of fuel under investigation and the special types of products which may be in demand for particular industries. The production of metallurgical coke and the manufacture of city gas may be cited by way of illustration. Of the products from coal now in increasing demand the following are the chief:

1.—A smokeless fuel, easily ignited and readily combustible with a minimum draught, and suited therefore to domestic use as a substitute for raw coal. The advantages of smoke abatement from the points of view of health, cleanliness, diminution of fogs, increased proportion of sunlight through a cleaner atmosphere are now too obvious to demand more than passing mention.

2.—The transference of a large proportion of the thermal value of the coal into a gaseous product available for efficient conversion into sensible heat for domestic and industrial purposes and for the production of power.

3.—The recovery of a large proportion of the nitrogen content of the coal in the form of ammonium sulphate or other nitrogen compound available as a fertilizer. Increased agricultural production will be dependent to some extent upon the availability of such materials.

4.—The maximum yield of such products of tar as are not only at present in demand, but which, in the near future, give promise of enormously increased demand in many industries. Of such products oil fuel, lubricating oil, Diesel oil, burning oil, motor spirit, solvent naphtha, creosote oil, benzol, toluol, carbolic acid, and naphthalene may be mentioned.

Simultaneously, however, the rapidly increasing demand for electric power raises the important issue as to the yield of products of the carbonization process, which will be available for utilization as sources of heat in large steam units with the production of electrical power at low cost. The long-anticipated trade expansion and increased industrial output demand plentiful and cheap power developments in electrical power production and gas engineering need not—indeed must not—be regarded as competitive, but rather as co-operative systems. In both spheres there is ample room for progress, of the near realization of which we may rest safely assured.

In the present day we have at last come to look upon the direct combustion of raw coal as an extravagantly wasteful proposition, so inefficient that the most optimistic anticipations of electrical power production from raw coal cannot outweigh the disadvantages of loss of by-products. It may be safely stated that the thermal utilization is highest in a modern type of boiler on which an efficiency of 80 per cent may be, though very seldom is, achieved. The subsequent conversion of the thermal energy in steam into mechanical energy is another matter upon which it may not be safe to antici-

pate very big improvements. There is, however, room for something to be done to ensure that tar products, which have a high value in industries, shall not be almost entirely wasted by being used for steam raising purposes. Any new system of fuel treatment must provide for a large proportion of fuel, solid, liquid, or gaseous, which shall be efficiently serviceable for steam raising purposes.

The carbonization of coal stands out pre-eminently as the efficient method of extracting the greatest share of the thermal and chemical values of coal. The general processes of carbonization are divisible under two headings, according to the temperature employed: High temperature carbonization referring to 1,000 deg. C. and over, and low temperature carbonization representing from 500 to 600 deg. C.

High temperature carbonization is exemplified in (q) the production of metallurgical coke by the rapid distillation of coking coal, producing a compact coke capable of withstanding the high pressures of the blast furnace. Concomitant are a relatively small amount of tar containing a large proportion of pitch, a large yield of good-grade gas which, after scrubbing, is partly utilized for heating the ovens, a surplus being available for other purposes and a fair quantity of ammonium sulphate. The main aim is, however, the quantity and quality of the coke. In (w) the production of manufactured city gas the carbonizing temperature is a little lower and the process somewhat more protracted. The products vary accordingly. A large yield of gas of high calorific valuable oils results. Sulphate of ammonia to the extent of about 25 lb. per ton to represent probably a 20 per cent recovery.

Low temperature carbonization at about 500 deg. C. has also been put to the test on a large scale. Experiments over a long period have resulted in highly satisfactory results. The application of the process has a number of features which sharply mark it off from the ordinary gas process. Figures for recoveries are variable, and can only be given with approximation. The gas varies from 2,000 to 4,000 cu. ft. per ton, is of a high calorific value, contains less than 15 per cent of hydrogen, but is characterized by the large proportion of methane, ethane, and other paraffins and some olefines. Tar amount to 7 to 10 per cent, or 14 to 20 gallons per ton. It contains paraffins and naphthenes chiefly, with little or no benzenoid compounds, and yields a soft carbon-free pitch. Ammonia recovery is low, amounting to only about 7 lb. of the sulphate per ton, while the product semi-coke contains from 10 to 15 per cent of volatile matter, but is smokeless. Low temperature carbonization offers, therefore, a marked contrast with the high temperature process. It leads to large yields of tar, and from tar various oils, notably those suitable for steam-raising. Through the process, the natural resources of coal may be made to yield oils which, in so far as they are available, are adequate substitutes for imported oils of the petroleum type.

Again, low temperature processes may be run with different ends in view, and applied to different types of fuel. There are at least three well-defined methods of application:

1.—Primarily, for the production of a good smokeless domestic fuel, with oil and ammonia by-products. The gas yield would suffice to fire the retorts, and the oil amount to about 20 gallons per ton.

2.—Primarily for oil leaving a carbonaceous residue, which with steam, can be converted to low-grade gas, with a high ammonia yield.

3.—Essentially oil with a waste product in the residue. This is exemplified in the shale industry.

Low temperature treatment thus realizes high recoveries of oils of certain types, and suited to different process, but such a process may fail to take the fullest advantage of the values in the coal. From the national point of view the process or processes of distillation must be that or those producing the greatest wealth. Every demand for products must, as far as possible, be met. This is what has been described as "constructive" distillation rather than "destructive" distillation. Movements in this direction are seen in by-products from coke ovens and the "stripping" of gas of its benzol without unduly depreciating its thermal value. Any new process must, therefore, give attention to the production of materials much in demand without producing a by-product which has little value, or may even combine the different objects in adapting two distinct stages in the carbonizing process. In any case, a proportion of the thermal value of the fuel, either from the gas of solid residue, must be used to supply the heat required in the several operations. In one low-temperature process the solid product of the semi-coke character is definitely aimed at. In another the solid residue, which may fail to attain the properties most desirable in a domestic fuel, or complete gasification of the solid product for power gas purposes may be decided upon, thereby also yielding a further recovery of ammonia.

In addition to the recoveries of by-products, if such term can still be adequately employed, the character of the solid smokeless fuel must receive attention. It must be of such a character of strength as will enable it to be handled freely and be transported without disintegration.

Within the past three or four years a new process, involving a two-stage carbonization, has been developed in the United States as the result of an elaborate series of experiments conducted at Irvington, N. J., and carried on under the direction of Charles H. Smith, a member of the American Institute of Mining Engineers. The process yields a smokeless fuel from high volatile coals, and includes also the recovery and refining of the coal tar products. An essential feature of the process is that it involves carbonization in two distinct stages, each with a very definite object.

In the first stage, the raw coal after being crushed is distilled at the relatively low temperature of 850 to 900 deg. Fahr. This "primary" distillation is accompanied by constant agitation of the charge, this being effected by paddles which also move the charge through the furnace. A uniform distillation is thus ensured, and the permitted partial carbonization occupies a period of from one to two hours. The products of primary distillation includes gas, tar and a solid residue rich in carbon and termed "semi-carbocoal." The yield of gas is stated to be from 5,000 to 6,000 cu. ft. of 650 to 700 B.t.u. per cu. ft. The tar amounts to about 14 to 16 imperial gallons per ton of coal.

The solid product, semi-carbocoal, discharged from the low-temperature retorts is mixed with pitch obtained from the tar distillation in the proportion of about 7 per cent and the mixture briquetted. The briquets are now subjected to the "secondary" distillation at a much

(*Continued on page* 31.)

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As the Journal Views It

And They Had Their Warning

So far it has been the kind of a winter that chills the gas man's feet and warms his heart. It has brought to an American gas company the world's daily output record.

Also it has, as usual, caught many gas companies understocked in auxiliary heaters.

Now, this wouldn't vex us so much if the AMERICAN GAS ENGINEERING JOURNAL as early as the first part of November hadn't told the gas field at large exactly what kind of a winter it was going to be.

Because we were a little uncertain as to our authorities—the heavy weather sides of trees, the bees and the berries—and the official forecasters were so confounded stubborn in their contention that that was a little too far ahead to promise anything, we were not quite as emphatic in stating our conviction as we might have been—in fact, we even made so qualifying a reservation as "Maybe it will be a hard winter—and long" and "On the other hand, it may not be." But the fact remains, we did emphatically advise gas companies to be stocked up in heaters of the auxiliary type.

This falling short by a business whose duty is to supply heat, in the means of doing so at the time it is most needed, has become so much the invariable rule as to be quite embarrassing.

Some more scientific rule than "hunches" should be applied to determining in advance the quantity of appliances of a certain kind we are going to require in different seasons.

The winter could have been a mild winter, but it has proved severe. Those fortunate guessers who *felt* it was going to be severe and stocked up ac-

cordingly have had, no doubt, ample reason to congratulate themselves on their acumen.

Maybe next summer is going to be damp, cloudy, drear and chilly. If so, it won't be much of a summer for gas ranges. Or, beginning early, it might be a blistering affair, such as will give one a headache even to think of a coal range adding its quota of unwelcome heat to the walls of a dwelling place.

One guess is as good as another. The fortunate guesser will either sell a lot of gas ranges or leave the manufacturer carry the burden of cost of stock in the warehouses.

Why not find out what has been the average summer demand for gas ranges, and stock accordingly? Then, if the actual demand proves greater the manufacturer should be able, by speeding up a little, to take care of us. If the demand proves lighter we'll have so much stock already on hand toward the quantity necessary to meet an average demand for the next summer, yet not such a quantity as to bankrupt us paying the carrying charges.

We all want costs of some kind at least to come down. Who knows but that, if we lightened their burdens by being intelligent and consistent in our buying, the manufacturer could sell us our appliances cheaper yet sacrifice nothing of profit?

A Healthful Condition in Any Industry

An industry progresses very much in proportion to the volume of helpful and sound literature it produces.

There has been and is a great dearth of good gas literature, but of recent years the gas man in greater numbers has begun to write descriptively of his experiences and to set down on paper for publication his views as to future trends and possibilities.

From a condition wherein it was almost impossible to secure even one original article written by an actively engaged gas man for each week's issue, the AMERICAN GAS ENGINEERING JOURNAL has within the space of three years come to a point where it sometimes loses the opportunity of publishing really desirable matter, for the mere reason that it cannot promise a definitely early publication.

Anyone who is more than superficially acquainted with the gas man's tastes and characteristics knows that the writer of any article, or technical work, intended for his enlightenment, who with reasonable competence attains his aim, is assured of a conscientious and appreciative reading.

The gas man is an avid reader. Though the number of men engaged in the gas industry is few in proportion to the capital invested; few in comparison to the numbers actively interested in other fields basically technical, the gas man does not suffer in comparison as a buyer of technical literature devoted to his problems.

The fact that the firm which is popularly conceded the biggest publisher of textbooks in the world has for several years past been regularly adding essentially gas books to the list of its publications is good evidence that the gas man, despite his relative paucity in numbers, buys enough of such works to make their publication possible, and possibly profitable.

The fact that the subscriptions added to the mailing lists of the AMERICAN GAS ENGINEERING JOURNAL constitute a curve that parallels to a significant degree the increasing number of original articles it has published is indicative that the gas man is ready and eager to buy and read a gas journal in proportion to the degree in which it gets away from the "cut and dried" and the "see one issue and you see them all" plane, on which a few years ago he had gotten into the habit of mentally classifying his gas journals in general.

And the gas man is loyal to his gas journal. The writer of these lines has had other experience in endeavoring to enlist the co-operation of the reader toward making his journal more complete in scope, more helpful to all it reaches and more accurate. Securing such co-operation in the gas field has proved a vastly more simple and encouraging task than in his previous experience. The briefest, simplest and least costly canvasses have brought forth a degree of responsiveness that was altogether unlooked for.

It has come to be our conviction that the gas man makes his gas journal a part of his life. To what extent this journal is inspired, and *made* even, by its readers we would not like to estimate too closely. The findings might tend to diminish our self-esteem; it might be shown that our part amounts to close to nothing.

This gas journal has no complaints to offer as to the support it has been accorded by its subscribers and readers. When the thought has come to mind at all we have been awed in truth at the loyalty and appreciation that have been freely given in return for efforts that sometimes seem hardly worthy of it.

It does not believe any of its contributors (and they have been many) have had reason to complain of the reception that has been accorded their articles or the interest that has been manifested in them. It does not believe that any of these contributors would seek to discourage others inclined to the production of gas literature on the basis that it is a "thankless labor," for the majority of those whose first literary effort appeared in the pages of the JOURNAL have come back again and again with other offerings as their experience extended, and other ideas and suggestions that might be helpful to gas men were evolved from their minds or came to their knowledge.

There never can be too much gas literature, nor is there any reason to believe that reasonable reward will not redound to those through whose efforts

it may be produced. Rather is there a risk that with the rapidly broadening scope of the gas industry the production of pertinent literature may fall behind and its progress may be hampered thereby to no inconsiderable extent.

For years the AMERICAN GAS ENGINEERING JOURNAL has been urging the gas man to write. Its viewpoint has not changed except in that with each succeeding month its realization of the need and desirability of a more general activity on his part in this respect has intensified. It would not so urge were the gain confined to the gas industry and the JOURNAL alone, and for the author it was a "thankless task."

No matter how broad a man's knowledge; no matter how assiduously he may have studied, he can still benefit mentally and expand and retain better the knowledge he has gained, if he will write for publication. He will reap in addition an enhanced opportunity of personal advancement, a material return and additional good-will and prestige in his chosen calling.

The Carbonization of Coal Stands Out Pre-eminently as the Efficient Method of Extracting Its Greatest Thermal and Chemical Values

(*Continued from page* 28.)

higher temperature, viz., from 1,800 to 2,000 deg. Fahr. During this distillation a further volume of gas, about 4,000 cu. ft. of 350 to 400 B.t.u. per cu. ft. is recovered, and with a small proportion of tar, about four to six gallons per ton of fuel. Whereas, however, only a low yield of ammonium sulphate results from the primary distillation, the yield in the second stage is much higher, bringing the total recovery to 20 to 24 lb. per ton. During the second distillation all evidence of pitch as an ingredient disappears. The briquets shrink, correspondingly increasing in density, but they retain their shape, and represent about 72 per cent of the weight of the raw coal, the exact figure depending upon the volatile content of the coal. This solid product is called "carbocoal." It is dense, clean, uniform in size and quality, and may be readily handled and transported along distances without undergoing disintegration. It is manufactured in briquet form in sizes from 1 to 5 oz. For domestic purposes the smaller sizes are used. Its combustion is not attended by the production of the clinker, the briquets being gradually reduced in size during combustion. Carbocoal shows the following analysis averaged from a wide range of coals:

	From Run of Mine. Per Cent.	From Washed Coal. Per Cent.
Moisture	1.00 to 3.00	1.00 to 3.00
Volatile matter	.75 to 3.50	.75 to 3.50
Fixed carbon	82.00 to 88.00	85.00 to 90.00
Sulphur	.50 to 1.50	.60 to 1.50
Ash	8.50 to 12.00	7.00 to 10.00

As a devolatilized fuel it has a high rate of combustion and is thus suited to steam raising for locomotive, marine and general purposes. It has been tested by the Long Island Railroad, by the Pennsylvania Railroad, by the Clinchfield & Ohio Railroad, and the United States Navy, after investigating the process, built a plant at Clinchfield, Va. As a consequence of its smokelessness, it is suited to use under stationary boilers, furnaces, stoves, range and open grates, in kilns and drying ovens in metallurgical furnaces and in gas producers.

Brief reference has already been made to the yield of gas and tar. The total yield of gas is of the order of 9,000 cu. ft. of about 530 B.t.u. per cu. ft. per ton of coal. As at present conducted, the whole of this gas is used in the process. Further reports will be awaited with interest to determine whether the utilization of this gas provides the most economic source of heat for the various operations which constitute the process. The semi-carbocoal, the intermediate product, offer possibilities for the production of power gas, and as it contains nearly the whole of the nitrogen content of the original fuel, it provides scope for ammonia sulphate of about 21 lb. per ton of fuel.

Passing now to the tar, this constitutes a feature of all controlled carbonization processes. By the "Smith" carbocoal process the yield of water-free tar is 20 gal. per ton of fuel, containing 25 per cent of volatile matter. In the first distillation 14 to 16 gal. are obtained. These figures include the light oil obtained by stripping the gas. This low temperature tar contains 70 per cent of tar oils and 30 per cent pitch. The higher temperature distillation yields 4 to 6 gal. of tar per ton and is in many respects similar to that obtained from coke ovens. It is heavier than the primary tar. For commercial purposes the two tars are mixed prior to fractional distillation, but the difference in composition is shown in the following table, in which a comparison with coke-oven tar is made:

	Distillation Temperature. Deg. Fahr.	Coke Oven Tar. Gal.	Primary Carbocoal. Gal.	Sec'd'ry Distillation. Gal.
Light oil	Up to 170	.18	1.06	.002
Middle oil	170-230	.3	2.20	.024
Creosote oil	230-270	.52	2.08	.084
Heavy oil	270-360	.84	5.92	1.656
Pitch	.....	3.10	4.60	2.194
Loss	.....	.06	.14	.04
Totals	.....	5.00	16.00	4.000

Of these products the whole of the pitch is utilized for briquetting the semi-carbocoal, and any valuable constituents of the pitch are recovered in the second distillation. Thus practically the whole of the tar products obtained in the process are oil derivatives. Large quantities of oils are thus rendered available from the fuel in addition to producing a solid smokeless residue of seemingly wide applicability, and a method of distillation admits of the recovery of benzol and toluol and motor spirit in the proportions of .16, .33, and .66 per gallon per ton. This combined low and high temperature distillation marks a definitely new step in coal carbonization.

A special feature of the process is that the dense product carbocoal is obtained from non-coking coal, resinous constituents of the pitch being used in briquetting effecting this solidification.

For such a process and for others conducted on similar lines there would appear to be a large future. The production of gas, for general purposes, and of coke of special metallurgical purposes has for a long time been adequately catered for. In neither case, however, is the yield of tar, nor its character such as will guarantee to the country an increasing supply of oils in demand for steam raising purposes, for which oils we are almost entirely dependent upon distant supplies. The increased home production of such oils is a matter of paramount importance to the nation. The results of the boring operations for petroleum in Derbyshire, England, are by no means very encouraging as offering anything like the quantity of oil necessary to meet the rapidly increasing demands of, say, the automobile and aeronautical industries of that country. Even assuming that success beyond present indications attend the project, the oils thus available in England will provide only a tithe of the country's needs. The distillation cannot reasonably be met. The place and importance of oil as a most portable form of energy in industry is now being recognized. Prophecies of progress cannot be dated too far ahead. The oil problem, which became very acute during the war, is one which may be solved by the application of all the known methods of treatment of raw materials, but which may not stand to be solved in the near future along any single one of the lines indicated above. The recovery of oil from fuels plays an important part, too in fuel economy and conservation. Decreased output is the order of the day, and we must needs utilize to the full rather than any longer waste the coal to which we have access. The lessons of the war must be applied in order to secure industrial success. As regards coal, economic use is a more important factor than increased output for wasteful consumption. As a matter of immediate expediency the export of coal from our shores may be desirable. The export, nearly 90,000,000 tons, arrests attention and stimulates thought. An effective carbonization of the coal would secure quantities of oil, which would go, at any rate, some way towards making good the naturally anticipated decrease. In the United States the development of the automobile is so rapid that the near future may see the demand for light petroleum products so large as seriously to interfere with the exportation of such oil to other countries. Alternative sources must be investigated and rendered available before it is too late. Interest in the whole problem as one of more ordinary national importance should be more widely in evidence. The consumption of coal in England exceeds four tons per head per annum, and proportionate sense of responsibility should be felt with regard to its economic use and conservation. While other efforts are being made to tap natural sources of energy, we must needs for a long time continue to look to coal as our main store of energy. Its products are as numerous as they are valuable. Power, heat, light, fertilizers, and a wide variety of oils lead the way in an almost endless profession of coal products, and their hundreds of derivatives, including dyes, explosives, perfumes, disinfectants, pharmaceutical and photographic materials and saccharin, through which we are at once put into close touch with numerous industries. The pinch of the fuel problem during the war and the effect on industry and production of the present shortage of coal must impress lessons of incalculable value towards the safeguarding of national interests of a profound character.

PUBLICATIONS

The Condensed Chemical Dictionary

Compiled and edited by the editorial staff of the Chemical Engineering Catalog, F. M. Turner, Jr., technical editor. Clothbound; 9¼ by 6¼, 525 pages. Published by the Chemical Catalog Co., Inc., New York. Price $5.00; leather, $6.00.

This is a worth-while contribution because the increased importance of the chemical industries has brought into contact with these industries a large number of people not educated along chemical lines and the Condensed Chemical Dictionary, the first edition of which appeared September last and now going into its second edition, is filling a much felt need of the layman, including exporters and importers, brokers and jobbers, financial houses, lawyers, librarians, purchasing agents, insurance companies and many other classes of firms and individuals, who are not chemists, and yet have frequent need for detailed information regarding chemicals and chemical products. It is not claimed to be an exhaustive work, but its contents include a mass of information on this subject gathered from hundreds of textbooks, periodicals, Government bulletins, etc., which have, so far as we know, never been compiled in any one volume before. Under each chemical is given its chemical sign, its color and properties, constants, specific gravity, the liquids in which it is soluble, its derivation, method of purification, its various grades, the kind of containers used for it, its uses, its fire hazard, and railroad shipping regulations. In addition to these properties and uses, brief notes have been inserted as to how things are manufactured, when they are not natural products.

It is a dictionary which will prove of great value to the chemist, as well as to the non-technical user, from the standpoint of a time saver, as a moments reference to it will answer a question, whereas much more time would be consumed in getting the same information from other sources. It is accurate and complete within the limits set for it, and has been carefully cross-indexed, thus affording a further assistance toward ready location of the items sought.

New Coal Publication—The Zone System

Author, Wayne P. Ellis. 124 pages.

This is a report of the Distribution Division of the U. S. Fuel Administration. It will appear in three parts, viz., Part I, The Distribution of Coal and Coke; Part II, The Zone System; Part III, Statistical Tables. At present Part II is the only one ready.

Whether viewed from the standpoint of the coal operator or of the traffic expert, the zone system was one of the great experiments of the war period. In this report Mr. Ellis has presented in detail the historical facts leading up to the adoption of the policy; has described the zones and modifications, and by quoting selected portions of the mass of correspondence on the subject, has shown at once some of the difficulties in administering such a policy and the methods pursued in meeting the difficulties. Maps of the twenty-two zones are included.

Period Styles in Gas Lighting Fixtures

Development of More Artistic Lighting Equipment a Certainty—Present-Day Designing of Lighting Fixtures Shows That Older Examples of Lighting Methods Are Followed and Ornamentation May Be Traced to Period Styles of Architecture and Household Furnishings

Italian Renaissance, Adam and Colonial are the preferred period styles in lighting fixtures to-day. Frank A. Driscoll, in a late issue of

THIS BRACKET IS A SPLENDID EXAMPLE OF THE ADAM PERIOD STYLE

Electrical Merchandising, says that business will go to the ones who know these styles and how to sell them.

From the most remote time the styles of lighting equipment have followed closely the character, customs and environment of the various peoples and have corresponded in growth to the development of their civilization and refinement, the skill of their workmen and the use of improved tools as well as the employment of a variety of materials. No new style has ever been created without a knowledge of some older period type and probably never well be.

The wide variety of materials available and the many splendid examples of ornamental design in the possession of the artists of to-day, make the development of more artistic lighting equipment a certainty. A visit to the studios devoted to the designing of lighting fixtures, especially of the residential type, discloses the fact that the general forms of candelabra, wall bracket or chandelier follow closely the older examples of lighting methods, while the ornamentation may easily be traced to the period styles of architecture, furniture and household furnishings.

The student of period styles may delve into the mysteries of design as deeply as he may desire and always find something interesting and instructive. The salesman in the studio, the dealer in lighting equipment and those who contemplate the purchase of a selection of lighting equipment must be able to obtain the information necessary to understand the harmony of furnishings and appreciate the actual excellence of the materials offered.

It has been said that the most persuasive kind of reasoning to-day is that which is based on the solid foundation of actual excellence. We have no great concern in these days for things that are old simply because they are old. We are inclined to believe that the new is better. We are a practical people, little given to sentiment. We do not care very much where things came from, no matter how far back in the past, but whether they can do their work. It is the work then of the designer skilfully to combine utility and style to meet this condition.

We must, of course, have a real

THE GRACEFUL LINES ARE USUALLY PLEASING IN THIS ADAM STYLE AND THE MOTIFS ARE SKILFULLY EMPLOYED

foundation for our taste in lighting equipment as in our furniture, rugs and other housefurnishings, if we are to avoid the dangers of poor selection. We as a nation are a bit self-conscious in the matter of taste in everything pertaining to housefurnishings. We are apt to be influenced very strongly by waves of popularity for one style or another. If we could be independent of the prejudice and taste of our neigh-

bors, we must be able to judge the excellence for ourselves. It is to this end that these suggestions are here given.

A careful study of the more popular period styles at this time, indicates a preference for three of the better known period styles in lighting equipment; the Italian Renaissance, the Adam and the Colonial. A brief description of each period style follows, to aid in the selection of the lighting equipment best fitted to harmonize with the furnishings with which they are to be placed.

THE COLONIAL PERIOD STYLE HAS ALWAYS BEEN IN FAVOR, AND THIS POPULARITY IS GROWING STRONGER EVERY YEAR

The Italian Renaissance

The Italian Renaissance is perhaps the most elaborate of the classic styles. Coming as it did after a period of Romanesque and Gothic, it was a return to the lines of Rome, combined with delicate and elaborate modeling of refined acanthus leaves, Arabesque scrolls, ribbons and flowers, swags of fruit as well as grotesque human and animal forms.

The Adam

R. and J. Adam, architects and designers, from whose work this period takes its name, are classed with the Georgian period. This style was a decided reversion to classic lines. The excavations of the Pompeii ruins were begun at this time and many examples of the magnificent architecture and household furnishings were brought to light, in almost perfect preservation. These rare, curious and interesting objects connected with the luxurious magnificence of Pompeii, gave new life to artistic design. The principal motifs were small rosettes or medallions, delicate wreaths, fluting placed closely together, rams'-heads, urns, festoons and classical moulding. The festoons were formed of flower-like husks with a conventionalized bow of ribbon at the top.

The Colonial

The Colonial period style was derived from three distinct sources. In Virginia and New England, the English styles were used and it is safe to say that many a Colonial example is nothing more or less than a correct Georgian production. The Georgian period includes the work of Chippendale, Hepplewhite, Adam and Sheraton and was the most interesting period in English design. New Amsterdam or New York being settled by the Dutch, produced a style after the contemporaneous designs in Holland which in turn were influenced by the Flemish and French work. Occasionally, we note a slight influence from the Spanish conquest, for example the Spanish foot seen on Flemish and Dutch productions. In the South, especially around New Orleans, "Colonial" signified the Louis styles and the Empire style.

From all these sources there has developed a style that is well called our own. In the Colonial "scroll" we have a new type. The Lion's claw was employed on the base of the productions of this period.

The designers of lighting equipment employ the motifs of period styles in the various designs of candelabrum, wall bracket and chandelier so skilfully that the completed production harmonizes perfectly with the furnishings of the same period. It is needless to say that the added efficiency of the modern gas burner make these productions indeed a combination of utility and beauty characterized by its actual excellence.

The merchandising renaissance throughout the gas industry is highly conducive to the study and application of period styles in lighting fixtures. The foremost manufacturers of lighting equipment are ready and willing to co-operate with the trade to the fullest extent to the end that the salesmen may be schooled in period styles.

Pure Style of Design Essential

The time when a meaningless combining of stock parts will be accepted as high-grade fixtures, must be superseded by better examples of pure style of design. The satisfaction obtained from the better patterns of lighting equipment is far more lasting and builds better business.

Let your suggestions express your interest in the personal welfare of your customer. Co-operate with your brother salesmen in the furniture studios. Cultivate the friendship of the decorator and adopt his methods. Learn to guide your customer's taste and impress him with confidence in your judgment, based on knowledge and experience in the proper treatment of lighting problems. In order to do this, make the period styles a special study. Let this mark your renaissance in sales building.

COLONIAL BRACKET SHOWN ABOVE EXEMPLIFIES THE PERIOD OF GLASS LAMPS IN FAVOR 170 YEARS AGO

N. Y. Consolidated Department of Utilization Rendering Invaluable Service Raising Standard of Appliances

Through the New York Consolidated Company's Department of Utilization, under which the work of the testing laboratory is done, assistance is rendered owners and architects for the proper and complete piping of buildings so that gas may be used in their every part. Department of Utilization experts also make surveys of private houses and large apartment and other buildings, where a gas hot water system or a central gas heating system is to be installed to take the place of other fuel. These experts analyze the costs of the old

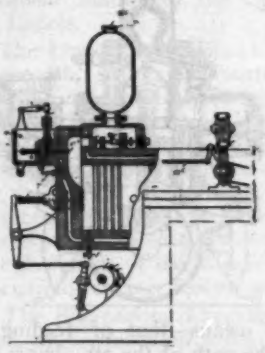
(*Continued on page* 40.)

PATENTS PERTINENT TO GAS INDUSTRY

Internal Combustion Engine

Patent No. 14,766; described in Patent Office *Gazette*, Dec. 9, 1919, page 338. Paul A. Lawrence, Benson, Neb. Filed Jan. 15, 1919. Serial No. 271,323. Original No. 1,235,491, dated July 31, 1917, Serial No. 854,534, filed Aug. 1, 1914. 11 Claims. (Cl. 60—16.)

The essentials of this internal combustion engine are a cylinder, a crank shaft and a piston which travels close into the cylinder head and compresses

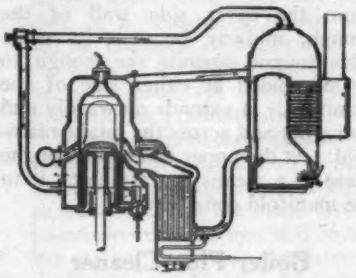


air on the inward stroke. The inward stroke is drawn in on the preceding outward stroke, or is delivered to it in a two-cycle operation. There is an air chamber which is closed by a valve. This air chamber contains compressed air of a pressure but slightly less than the highest working pressure of the engine. It is of such size that the pressure is only slightly increased by receiving the entire charge of air compressed by the inward motion of the piston. The air chamber is connected to the cylinder by a passage beyond the innermost travel of the piston, into which the fuel is injected on the following outward stroke.

Multicylinder Internal Combustion Engine

Patent No. 1,324,183; described in Patent Office *Gazette*, Dec. 9, 1919, page 225. William Joseph Still, London, England. Filed May 19, 1919. Serial No. 298,204. 3 Claims. (Cl. 60—14.)

This multicylinder internal combustion engine is adapted to operate partially under steam used expansively at the backs of the combustion engine cylinders pistons in cases where the steam spaces of one or



more of the combustion engine cylinders is or are supplied with high pressure steam and the exhaust steam for these cylinders is used as low pressure steam in another combustion cylinder or cylinders whose total steam space is of greater volume than the total steam space of the cylinder or cylinders to which the high pressure steam is supplied.

Gas Collector

Patent No. 1,324,292; described in Patent Office *Gazette*, Dec. 9, 1919, page 246. Ira J. Babcock, Chicago, Ill. Filed Sept. 9, 1918. Serial No. 253,345. 8 Claims. (Cl. 23—3.)

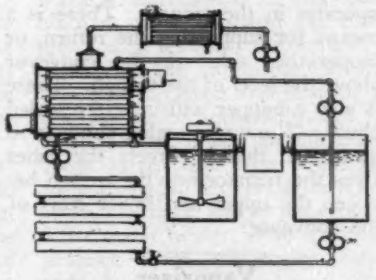
This container for the collection of gas has an auxiliary chamber be-

low it. There is a draft tube leading from the bottom of the auxiliary chamber, and a duct connects the bottom of the container with the bottom of the auxiliary chamber. A gas inlet pipe communicates with this duct substantially at the point of connection of the duct with the auxiliary chamber.

Apparatus for Collecting and Isolating Soluble Salts from Flue-Gases

Patent No. 1,324,737; described in Patent Office *Gazette*, Dec. 9, 1919, page 331. Lloyd D. Gilbert, Philip S. Taylor, John G. Dean and Louis E. Elder, Victorville, Cal. Filed June 25, 1917. Serial No. 176,886. 4 Claims. (Cl. 23—22.)

This is an apparatus for recovering soluble salts which are carried in suspension in superheated water vapor. Walls form an evaporating chamber, and there are other walls which form a condensing chamber. A wall, through which heat can be readily transferred, separates these



two chambers. There is a means for passing the superheated water vapor, with its superheated particles, into the condensing chamber. Also there is a means for collecting the condensates from the condensing chamber, and a filter with a means for passing the condensates through it into the evaporating chamber. The evaporating chamber has a means for maintaining a partial vacuum on it.

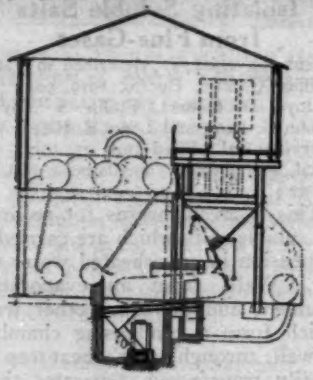
In combination with the apparatus above described there is a means for withdrawing a portion of the con-

densates from the evaporating chamber. Also a device for cooling the portion so withdrawn. This cooling induces crystallization of the soluble salts. In addition, there is a means for returning to the evaporating shoulder the portion withdrawn with any uncrystallized salts that may be carried therein

Device for Removing Ashes and Clinkers from Grates of Boilers

Patent No. 1,324,671; described in Patent Office *Gazette*, Dec. 9, 1919, page 319. Robert K. Hay, Chopwell, England, assignor to himself and Underfeed Stoker Company, Ltd., London, England. Filed Aug. 12, 1919. Serial No. 317,039. 2 Claims. (Cl. 110—165.)

This apparatus for removing ashes and clinkers from furnaces comprises a combination of a water sealed trough placed below the furnace and



an endless scraper conveyor which operates in the trough. There is a means for supporting the return, or inoperative side of the conveyor above the level of the trough. There is also a hopper with a water sealed chute. The water sealed chute is so positioned that it directs the ashes from the furnace into the trough between the upper and lower runs of the conveyor.

Vaporizer

Patent No. 1,324,273; described in Patent Office *Gazette*, Dec. 9, 1919, page 242. Anton I. Sandbo, Rock Island, Ill. Original application filed July 7, 1917, Serial No. 179,187. Divided and this application filed Dec. 16, 1918. Serial No. 266,942. 1 Claim. (Cl. 263—5.)

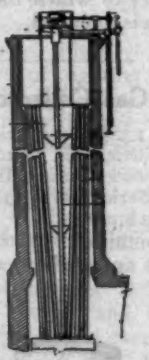
This vaporizer can be attached to the manifold construction of an internal combustion engine. It can be attached to either side of the intake manifold. It comprises an elongated narrow fuel holding torch in the shape of a trough, which is entirely open at the top from one end to the other. This is for the purpose of holding absorbent non-combustible material and fuel. This absorbent non-combustible material can be dis-

posed of running lengthwise in the though, under the intake manifold, at either side of it. A tongue extends from the outer side wall of the trough, midway between its ends. This tongue permits the trough to be suspended at either side of the manifold. It extends outwardly and upwardly and across the intake manifold. At the upper end of the tongue there is a means for attaching it to the manifold construction.

Boiler Flue Cleaner

Patent No. 1,324,201; described in Patent Office Gazette, Dec. 9, 1919, page 229. John Magee, Detroit, Mich., assignor to Diamond Power Specialty Company, Detroit, Mich., a corporation of Michigan. Filed Oct. 1, 1915. Serial No. 53,602. 1 Claim. (Cl. 122—392.)

This is a combination of a boiler with a vertically disposed cylindrical outer casing and a bottom header

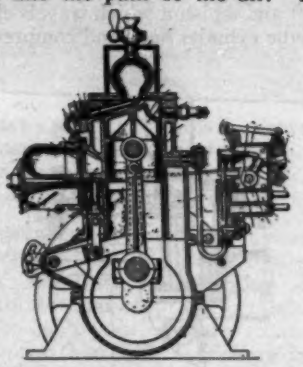


within the casing. At the upper end of the casing there is an annular top header. A plurality of a concentric series of tubes connect the bottom and top headers. This forms a central chamber. Extending across this central chamber there is a baffle plate. Extending upwardly from the annular header there is a flue. A cleaner, comprising a perforated blower tube, extends axially through the annular header, the central chamber and the baffle plate. There are connections which supply steam to the tube. These connections extend through the flue, and the journal bearings which are adjacent to the ends only for the tube. There is an actuating mechanism within the flue, adjacent to the upper journal. This mechanism causes the rotating of the tube.

Internal Combustion Engine With Means for Induction of Air Into Cylinder

Patent No. 1,324,298; described in Patent Office *Gazette*, Dec. 9, 1919, page 247. Gottlob J. Brauning, Detroit, Mich. Filed Oct. 16, 1916. Serial No. 126,000. 6 Claims. (Cl. 123—30.)

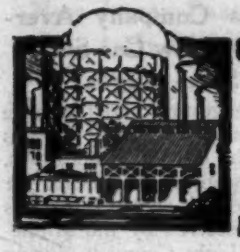
This internal combustion engine comprises a combination of a means for effecting the induction of air into the cylinder and a means for feeding fuel into the path of the air. The



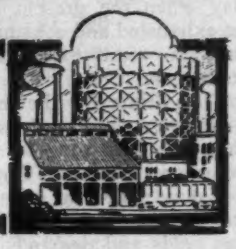
latter means—that of feeding fuel into the path of the air—has a tubular nozzle which is composed of an elastic metal. This nozzle is split lengthwise and the opposing walls of the slit normally abutt against each other. This prevents the passage of fluid from the nozzle. There is a pump which delivers a predetermined charge of hydrocarbon under pressure to the nozzle. The charge is adapted to forcibly expand the nozzle and open the slit in it, which allows for the projection of a charge of hydrocarbon into the path of the air entering the cylinder.

Marlboro - Hudson Company Petitions New Financing for Extensions

Marlboro-Hudson (N. Y.) Gas Company has petitioned the department of public utilities for authority to issue 1,280 additional shares of stock at $100 par to pay for extensions and improvements. The new shares will bring total capitalization up to $398,000.



NEWS OF THE GAS INDUSTRY



Eight Vacancies for Appointment to Research Graduate Assistantships Open at University of Illinois

At the close of the academic year, Jan. 31, 1919, there were eight vacancies to be filled, or in other words, eight appointments open for the research graduate assistantships maintained by the Engineering Experiment Station of the University of Illinois.

The University of Illinois, at Urbana, Ill., maintains fourteen Research Graduate Assistantships in the Engineering Experiment Station to assist in the conduct of engineering research and to extend and strengthen the field of its graduate work in engineering. Two other such assistantships have been established under the patronage of the Illinois Gas Association, making sixteen in all.

The Engineering Experiment Station, an organization within the College of Engineering, was established in 1903 for the purpose of conducting investigations in the various branches of engineering, and for the study of problems of importance to engineers and to the manufacturing and industrial interests of the State of Illinois. Research work and graduate study may be undertaken in architecture, architectural engineering, ceramic engineering, municipal and sanitary engineering, physics, railway engineering, and theoretical and applied mechanics.

These assistantships, for each of which there is an annual stipend of $500 and freedom from all fees except the matriculation and diploma fees, are open to graduates of approved American and foreign universities and technical schools who are prepared to undertake graduate study in engineering, physics, or applied chemistry.

The conditions of appointment to a Research Graduate Assistantship are as follows:

An appointment to the position of Research Graduate Assistant is made and must be accepted for two consecutive collegiate years, at the expiration of which period, if all requirements have been met, the degree of Master of Science will be conferred. Not more than half of the time of a research graduate assistant is required in connection with the work of the department to which he is assigned, the remainder being available for graduate study.

Nominations to these positions, accompanied by assignments to special departments of the Engineering Experiment Station, are made from applications received by the director of the station each year not later than the first day of March. The nominations are made by the executive staff of the station, subject to the approval of the president of the university. Nominations are based upon the character, scholastic attainments, and promise of success in the principal line of study or research to which the candidate proposed to devote himself. Preference is given those applicants who have had some practical engineering experience following the completion of their undergraduate work. Appointments are made in the spring, and they become effective the first day of the following September. Vacancies may be filled by similar nominations and appointments at other times.

The work of the Engineering Experiment Station is closely related to that of the College of Engineering, and the heads of departments in the college constitute the executive staff of the station. Investigations are carried on by members of the station staff and also by members of the instructional staff of the College of Engineering.

Additional information may be obtained by addressing The Director, Engineering Experiment Station, University of Illinois, Urbana, Ill.

THE CONSOLIDATED GAS COMPANY, of Boston, Mass., output of gas for December, 1919, totalled 658,446,000 cu. ft., an increase of over 5.43 per cent over December, 1918.

Laclede Gas Light Company Earns Money for Tuberculosis Society at Banquet

At the annual dinner of the department heads of the Laclede Gas Light Company, of St. Louis, Ill., held during the holidays, the fruit served during the dinner was auctioned off for the benefit of the St. Louis Tuberculosis Society. One hundred and sixty-one dollars and fifty cents was realized for the society.

Secretary Lane Calls Conference to Discuss Waste of Natural Gas

A public conference of governors, public utility commissioners, State geologists, home economic experts, natural gas companies, owners and officials, and appliance manufacturers has been called by Secretary of the Interior Lane to meet under the auspices of the Bureau of Mines at the Interior Department Building, Washington, D. C., Jan. 15, to discuss the waste of natural gas in this country both by consumers and gas companies. As a result of the work of the experts of the bureau on this question, it is declared that in using natural gas the consumers through faulty appliances, obtain an efficiency of about 13 per cent from a gas range for cooking, 25 per cent from a house heating furnace, and 10 per cent from a hot water heater, although in good practice these efficiencies can be trebled.

In a statement as to purposes of the conference, Dr. Van. H. Manning, director of the Bureau of Mines, said: "Domestic consumers waste more than 80 per cent of the gas received. The efficiency of most cooking and heating appliances could be trebled. By making natural gas worth saving the 2,400,000 domestic consumers in the United States could get the same cooking and heating service with one-third of the gas; that is, make one foot of gas do the work of three and greatly delay the

day when the present supplies will be exhausted and consumers must go back to more expensive manufactured gas.

"It is time for the public to take a new viewpoint on the waste of natural gas. It is time for the domestic consumer to realize that his duty is not done when he cries out against the flagrant wastes occurring in the gas fields and demands of his Government that such wastes be abated; he must realize that he himself is likewise at fault and that it is time for him to set his own house in order. Furthermore, the domestic consumer must realize that these wastes do not concern him alone, and consequently he has not the right, merely because he pays for the gas, to employ it in any manner that pleases him no matter how wasteful. Natural gas is a natural resource in which every inhabitant of this country has an equity. Those who waste the gas do so at the expense of those who would use it efficiently. Natural gas is not replaced by nature, and in comparison with the life of the nation the duration of the supply will be brief.

"The public has a right, therefore, to demand that this natural asset be used to the greatest advantage of all and that no one be allowed to waste it. Natural gas in each city is a community asset and every consumer has a right to demand that wasteful use shall be prohibited in the interest of the public service. This is particularly important during cold spells in the winter when the supply is insufficient and actual suffering may occur. Clearly, it is not right that any consumer suffer at such times because of the extravagance and waste of other consumers, even though they are willing to pay for the gas wasted. Nor can the citizens justify demands for better service from the public utilities without making provision to correct abuses in their own homes. It must be recognized that the public has been and is to-day just as much a party to the crime of wasting this natural resource as are the companies that produce and market it."

$35,000 Subscribed for Gas Plant in Magnolia, Ark.

In two days the sum of $35,000 was subscribed toward a proposed fund of $75,000 for the installation of a gas and power plant in the city of Magnolia, Ark. The movement for a gas plant was started by the business men of the city.

F. W. Ofeldt & Sons Change Firm Name

The AMERICAN GAS ENGINEERING JOURNAL has just received word that F. W. Ofeldt & Sons, of Nyack, N. Y., makers of water tube boilers, have changed the firm name to the Ofeldt Gas Fired Boiler Company. This change of firm name took effect on Jan. 1, 1920.

Stockholders Approve N. Y. Consolidated $25,000,000 Bond Issue

At the special meeting called recently the stockholders of the Consolidated Gas Company approved the creation of $25,000,000 5-year secured 7 per cent convertible bonds maturing Feb. 1, 1925. The bonds are convertible into stock at par on Feb. 1, 1922, or any interest date thereafter. They are being issued to fund a similar amount of bonds which mature on Feb. 1 next.

The new bonds are to be secured by $35,000,000 par value of the capital stock of the New York Edison Company, owned by the Consolidated company. The whole issue is to be underwritten by the National City Bank.

Stockholders of record on Jan. 3 had the right to subscribe on or before Jan. 17 to the new bonds to the amount of 25 per cent of their holdings at par. Should any of the bonds remain unsubscribed stockholders so desiring will be allotted a part of the unsubscribed balance. All of the bonds not taken by the stockholders are to be disposed by the trustees to such persons as they may determine at not less than par.

Payments by stockholders for the bonds are to be made 5 per cent upon subscription and the balance on or before Feb. 2, 1920. In the case of an allotment above the 25 per cent, 5 per cent is to be paid upon notice of allotment and the balance on or before Feb. 2, 1920. Payment for the new bonds is to be made in cash or in the present 6 per cent debentures which mature on Feb. 1 next. The new bonds are to be issued in denominations of $1,000 and $500, while scrip will be issued for smaller amounts. The company will shortly ask the Public Service Commission to approve the issue.

Minneapolis Company Averages 1,000 New Gas Services Since August

Housing congestion and the large number of new apartment houses going up in the city of Minneapolis, Minn., are assigned as reasons for the unprecedented demand for gas installations received by the Minneapolis Gas & Light Company during the last few months.

Since August, the company has averaged 1,000 new services with indications that the rush will continue past the first of the year. Ordinarily April and September finds the heaviest demands, and gas company officials say the lateness of the work this year has established a record.

The company recently purchased five motor cars for the service crews, which have resulted in a material reduction in labor cost. Two men with a machine take the place of six men under the old method of using street cars and horse drawn vehicles for transportation, according to company officials. The men carry with them all ordinary tools and materials, thereby avoiding delays in return trips to the office or shop.

Illinois Commission Claims Profiteering Landlords Have Placed Gas Company Under a Greater Strain

Profiteering landlords who attempted to gain through the recent coal shortage which tied up Chicago industry, were sharply rebuked by the Illinois Public Utilities Commission which declared that these landlords were badly hampering the gas company in its efforts to render a great public service.

Many of the landlords cut down on heat, which was contrary to the orders of the commission and of the public health department.

"Tenants whose heat is curtailed find it necessary to keep warm with gas, with the result that the Peoples Gas Light & Coke Company is placed under a still greater strain. A gas shortage would be worse than the collapse of the electric plants, for the city would go hungry."

In still stronger terms the commission warned landlords of the consequences that could be expected, and the following day thousands of tenants who had complained reported improved conditions.

The gas company also felt the change in short order.

Public Service Company of New Jersey Passes Quarterly Dividend

Public Service Corporation of New Jersey has passed the regular quarterly dividend of 1½ per cent on the common stock due Dec. 31, 1919. The regular quarterly dividend of 2 per cent on the preferred was declared payable Dec. 31 to stock of record Dec. 20.

Following a meeting of the directors of Public Service Corporation of New Jersey held recently when this regular quarterly dividend of 1½ per cent on the common stock was passed, President Thomas N. McCarter issued this statement:

"In view of the difficulties which the gas company and the railway company, two of the corporation's three principal subsidiaries, have encountered during the current year, in endeavoring to meet the vastly increased costs of labor and material under insufficient rates, and especially in view of the loss sustained by the railway company in the zone system experiment, amounting to approximately $1,500,000 now happily concluded, the board of directors of the corporation, after a full consideration of the facts, has thought it prudent to omit the declaration of what would have been, under normal conditions, the last quarterly dividend upon its common stock for the current year. This is thought wise as well from the standpoint of the conservation of cash resources, as from a consideration of the earnings statement."

The common stock has been on a 6 per cent annual basis during 1918 and the current year. There is $29,999,600 of the common stock outstanding. Dividend requirements on the stock at the rate of 6 per cent amount to $1,799,976 annually, almost equaling the $1,800,000 required for a full year's interest on the 5s.

The company derives its revenue from earnings of subsidiary companies, the Public Service Railway Company, the Public Service Gas Company and the Public Service Electric Company. Numerous smaller operating companies are controlled by these subsidiaries.

The passing of the dividend on Public Service Corporation of New Jersey common stock means a loss of $159,190 to United Gas Improvement Company, for the last quarter of the year 1919.

An estimate of earnings made during the third quarter of 1919 indicated that United Gas Improvement would be able to realize expectations for earnings upwards of 6 per cent., or at least $3,660,000 on its stock, which would compare with 5 per cent earned similarly in the year ended Dec. 31, 1918, but there were then $2,089,500 profits from sales of securities, which made the aggregate return 8.3 per cent. This special income was not expected this year.

Commission to Examine Boston Company's Books to Determine Rate Increase

When the Department of Public Utilities resumed consideration of the petition of the Boston (Mas.) Consolidated Gas Company that an increase be allowed in the standard price of gas, it was decided to have an investigation made of the books of the company to determine whether or not the company's claim that it is not operating at a profit is justified.

The company desires that the standard price be increased from $1 to $1.20 per 1,000 cu. ft. of gas sold. The standard price relates to the dividends which the company may pay, but an increase in the standard price in the past has been followed with an equal increase in the selling price. Consumers are now paying $1 per 1,000 ft.

American Gas Furnace Company Capital Stock Raised to $750,000

At a meeting of the American Gas Furnace Company stockholders, held at the plant in Elizabeth, N. J., the capital stock was increased from $150,000 to $750,000. More than two-thirds of the outstanding stock was voted in favor of the change. The proposed increase of capital stock will be used for further extensions of the company's business.

The American Gas Furnace Company, in its original articles of incorporation, had an authorized capital stock of $150,000, divided into 1,500 shares of the par value of $100 each. The original articles were filed July 13, 1894. Under the increased capitalization plan the number of shares will be increased to 7,500, the par value remaining the same.

George G. Machlet is president of the company and G. L. Reichhelm is secretary.

Gas Litigation Aimed at Chicago Company Cost City $101,700

A report just submitted to the special council gas litigation committee of the city of Chicago, Ill., shows that litigation aimed at recovery of so-called overcharges by the Peoples Gas Light & Coke Company under the 1911 70-cent gas ordinance will cost the city $101,700 in 1920.

Donald R. Richberg, the city's special attorney in the case, made the report. He said that $3,870 is necessary for office rent; $52,830 for engineering services; $15,000 for accounting services, and $30,000 for legal and other expenses. The case has been in the courts for seven years.

The committee directed that an itemized statement of the probable 1920 expenses be laid before it before any action is taken approving the sum requested by the attorney.

Brooklyn Union Asks for $1.05 Rate

The Brooklyn (N. Y.) Union Gas Company has filed a new rate schedule with the Public Service Commission calling for a price of $1.05 per 1,000 cu. ft. for the gas it supplies in the Borough of Brooklyn. The present rate is 80 cents a 1,000 ft., and the schedule filed with the commission states that the new rate is to become effective Jan. 22.

The company will shortly go before the local district court, seeking an injunction preventing the city and State authorities from interfering with placing the new rate schedule into effect. This is done to avoid penalties under the State law, which prescribes a heavy fine for charging more than the 80-cent price allowed by the law.

This new step is in line with the bill of complaint filed some months ago in the Federal District Court which charges that the present State law is confiscatory in that it does not permit a fair return on the property invested in the business. Hearings on this suit will start soon, as the appointment of the special master is expected to be made shortly.

Should the company be successful in obtaining the injunction, it can put the higher rate into effect until such time as the legality of the 80-cent gas law has been decided by the courts. Such money as would be collected above the present rate would, of course, be impounded until the suit is finally settled.

N. Y. Consolidated Department of Utilization Rendering Invaluable Service Raising Standard of Appliances

(*Continued from page* 34.)

services and figure out what the expense will be after the gas apparatus is installed. These services are given to the customer without charge.

Illuminating engineers connected with the department are constantly rendering aid to owners and occupants of buildings in the matter of proper and efficient lighting. Having tested the capability of every gas lamp, both for indoor and outdoor use, these illuminating engineers are qualified to arrange the installation of a lighting system, so that the highest efficiency may be obtained with a minimum number of lighting units —lamps.

The laboratory occupies a floor space of 20,000 square feet. It is here that all the appliance testing is done by the Department of Utilization; that is, the testing of gas ranges, steaming tables, coffee urns, etc., used by the largest hotels, the various industrial appliances and the smallest sizes of gas-using devices used in the household. Every variety of outside and inside gas lamp, and every variety of lighting appliance and accessory is tested here. In addition the laboratory does much development and research work, resulting in changes in design, increased efficiency, more perfect operation, greater safety and more practical design.

The New York Consolidated Company established this laboratory several years ago. To-day it is as complete for its purposes as any laboratory in the country. Every day all manner of gas-using appliances are subjected to thorough examination as to the materials used in their manufacture, their mode of construction, durability and hourly consumption of gas. Even the gas mantle does not escape a laboratory analysis, nor does gas-tubing find its way to the customer through the company's salesrooms until it has been subjected to the severest of tests. The same thing is true of ranges, gas heaters, gas water heaters and the various types of industrial and other burners.

There are three main divisions of the laboratory: one for work on all fuel and power appliances, one for lighting appliance work, and a third division for chemical and gas analysis work. An appliance received for testing or investigation is set up in its proper place. Gas, water, electric current and pressure air are at hand, together with test meters, thermometers, pyrometers and other testing apparatus. The appliance under test remains there until the investigation is completed to the satisfaction of the engineer and his assistants, no matter how many days or weeks that may mean. Approved, the appliance is ready for the customer. In the lighting division lamps are tested for their candle power values, an intricate kind of work filled with many details. Pressure and metering instruments and recording gauges are applied to domestic cooking appliances.

Every make of lamp that is on sale in the company's salesrooms has been tested in the laboratory. Lamps are tested as to their life (durability), efficiency and candle power. The complete test takes from three to four weeks. Every part of a gas range, cooker, hot-plate or other utensil is thoroughly tested before it finds its way to the gas consumer.

If the Department of Utilization reports that a particular appliance—cooking or heating—consumes a given number of feet of gas each hour, it does not say that the consumer through carelessness may not burn the gas in a wasteful manner.

For several years now this department has been carrying on its work in the interest of consumers. Probably every gas company is familiar with what it has accomplished and is accomplishing in raising the standard of gas-using appliances.

Roanoke Company Will Extend Lines to South Roanoke

Tentative plans for installing gas in South Roanoke, Va., homes has been announced by E. D. Dickey, manager of the Roanoke (Va.) Gas Light Company to the South Roanoke Civic Association. The company proposed that first mortgage bonds with an annual interest of 6 per cent to the approximate amount of $30,000 be issued for sale among the citizens of all sections of the city.

It is estimated that about 4½ miles of pipe will have to be laid to extend the city gas supply to South Roanoke. The system of pipes, which will cost about $30,000, will allow for future extensions.

Construction Notes

Louisville Company Has Completed Ten-Mile Pipe Line

An increased supply of natural gas will soon be available for business and domestic use in the city of Louisville, Ky. The Louisville Gas & Electric Company has completed a pipe line extending ten miles to the Floyd County fields. This additional supply will remove the possibility of a shortage.

Samuel Insull Places in Service Chicago Company's New Giant Gas Holder

The Peoples Gas Light & Coke Company put into service the largest gas holder west of New York, the purpose of which is to safeguard the city's supply of gas. President Samuel Insull opened the valve in the 36-in. main.

The new holder's capacity is 10,000,000 cu. ft. of gas, which adds approximately 20 per cent to the company's storage capacity. This will permit the company's gas making plants to operate continuously at full capacity, and provide an ample margin of safety for the city's supply when below zero weather produces abnormal demand, as on one day last January, when pressure in the mains fell to the danger line and the supply all but failed.

Construction of the new holder and connections has cost about $2,000,000. The water tank, which seals the gas in the balloon-like holder, is the largest ever built, and holds 16,000,000 gallons.

The entire structure, which is 228 ft. 4 in. high—taller than many skyscrapers—contains 4,300 tons of steel and 1,350,000 bolts and rivets.

Interurban Company Installs Motor-Driven Fan to Effect Saving of Coal

The Interurban Gas Company, of Nazareth, Pa., reports requests for gas service from twenty-five prospective customers. The company recently installed a motor driven fan in its plant. This fan should make a considerable saving in coal and at the same time better the service rendered.

New Orleans Gas Light Company Installs 11-Ft. Water Gas Set

The New Orleans Gas Light Company has just installed an 11-ft. water gas set to take care of its growing demands. The set was made and installed by the Western Gas Construction Company, Fort Wayne, Ind., and is attracting wide attention because of some distinctive features which mark the New Orleans installation as being unique in several particulars.

Probably the most interesting feature of the set is the reversing valve which is used in making up-runs and down-runs. This valve, contrary to the ordinary condition, is placed entirely beneath the operating floor, a plan which has been found to be of great convenience to the operator. The valve is also arranged so that the secondary air, on its way to burn the producer gas in the carbureter, is used to cool the reversing valve so effectively that a man can place his hand on the valve body while the set is in operation without danger of receiving a burn. None of the hot gases are sent vertically through the valve but are passed horizontally through large, short ports.

The valve is so placed that it is cleaned by the operator while standing on the cement floor, as he can reach the ash door without the aid of a ladder.

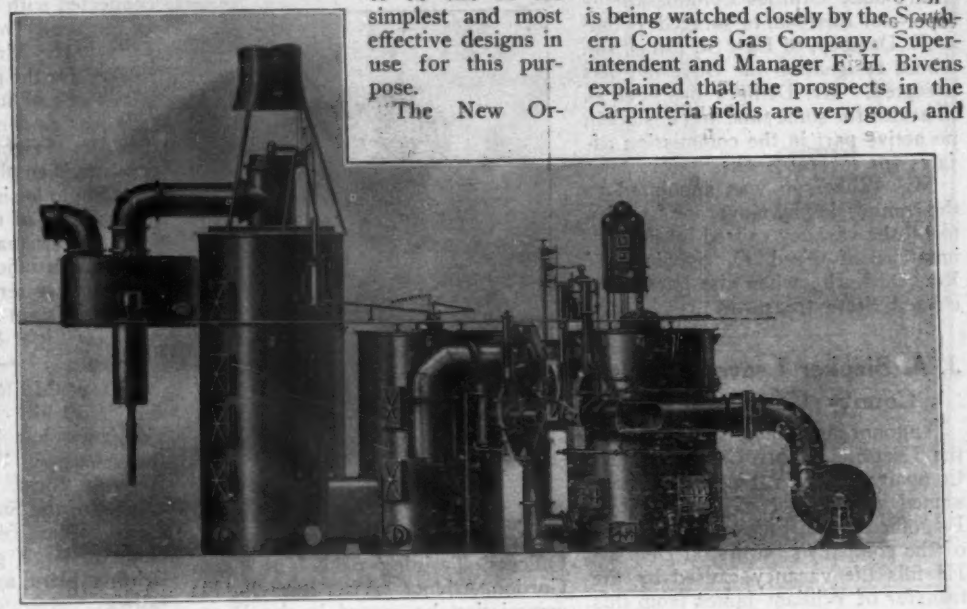
Tests of the reversing valve show that it operates in something less than three seconds. It has no tendency to stick either in the upper or lower position, and it does not "jam," as the limit of travel is determined by the hydraulic cylinder and not by impact of the valve disc inside the body.

The machine is also provided with an exceptionally large charging door, which is appreciated by the operator for the reason that he has practically no trouble from spilling coke in charging, as it gives him an extra large opening for the clinker bar when barring down from the top.

Another convenient arrangement is a mechanical connection between the oil spray and the stack valve which has eliminated the usual combination of sheaves and a loose cable. There is also an arrangement provided that admits the secondary air gradually to burn all the producer gas without sending any excess of cold air into the carbureter. This device proves to be one of the simplest and most effective designs in use for this purpose.

The New Orleans Gas Light Company reports that included among the other features of special worth are the compact bank of levers to control the hydraulic operating cylinders, by which the machine is operated with the least possible loss of time and energy; and the system of interlocking the levers which is perfectly frictionless and which makes it impossible for the operator to move the wrong lever or in any way to interfere with the proper operation of the set.

The New Orleans Gas Light Company has also purchased from the Western Gas Construction Company a water-tube gas condenser of such large proportions that it was necessary for the company to have the manufacturer send men to New Orleans to construct it on the ground.



11-FT. WATER GAS SET INSTALLED FOR NEW ORLEANS COMPANY

Southern Counties Company Spent $80,000 on Improvements Last Year—Plans for Laying New Main

The Southern Counties (Cal.) Gas Company is planning to lay a main from the fields of Carpinteria, Cal., to supply the city of Santa Barbara with natural gas.

Development in the new Carpinteria field of California to the south is being watched closely by the Southern Counties Gas Company. Superintendent and Manager F. H. Bivens explained that the prospects in the Carpinteria fields are very good, and that just as soon as gas is developed in the drilling for oil his company will make a deal for its purchase, and will within a short time afterward have a line under way from Carpinteria to Santa Barbara, Cal.

The Southern Counties Gas Company has just completed installing a high pressure main to the upper part of the city of Santa Barbara. Tests of this new installation are said to have resulted in showing that it is a great success. The company has spent $50,000 in installing the high pressure line and the automatic control, and in all the improvements completed during the past year have reached a total of $80,000.

This about completes improvements at present planned until the company will lay the gas main from the Carpinteria oil fields to Santa Barbara through which to supply the city with natural gas.

Personal Notes

Former U. S. District Attorney Wilkerson Chairman of Illinois Commission

James H. Wilkerson, former United States District Attorney, has been appointed chairman of the Illinois Public Utilities Commission by Governor Lowden, to succeed Thomas E. Dempcy, of East St. Louis, Ill., whose resignation the Governor has accepted. Mr. Dempcy has been in ill health for some time and has taken no active part in the commission affairs for several weeks.

Mr. Wilkerson was appointed to the commission by Governor Lowden to fill the vacancy caused by the resignation of Fred E. Sterling, of Rockford, Ill., when the latter was elected State treasurer.

J. A. Siepker Leaves St. Clair County Gas Company

Announcement has been made by the Luzerne County Gas & Electric Company that J. A. Siepker has been named as manager of its Hazelton, Pa., offices. Mr. Siepker took charge of the company's affairs on Dec. 27. He fills the vacancy caused by the transfer of William James from this office to a post in West Virginia under the same concern.

Mr. Siepker has gone to Hazelton, Pa., from East St. Louis, Ill., where he held a similar post under the St. Clair County Gas & Electric Company.

GEORGE E. NICHOLSON, president of the Nicholson Construction Company of Kansas City, Mo., and interested in smelter concerns, will be head of the new company that will take over the two distributing gas companies in Greater Kansas City.

GEORGE H. BROOKS, of Rutherford, N. J., has been appointed Eastern representative for the National Stove Co. Division. He will cover the territory of New Jersey, New York City and western Connecticut. Mr. Brooks will take up his residence on the territory beginning the first of the year. For the time being he has not selected any permanent headquarters.

Burch M. Lippitt, U. S. Army Man, Appointed Representative of National Stove Company Division

Burch M. Lippitt, of Cleveland, Ohio, has been appointed New England representative of the National Stove Company Division. His headquarters will be in Boston, Mass., where he took up his residence the first of the year.

Mr. Lippitt is a second lieutenant,

BURCH M. LIPPITT

I. R. C. He is a graduate of the Officers' Training School at Camp Gordon, Atlanta. After receiving his commission he served in the Property Section, U. S. Ordnance Department, Cleveland, Ohio.

Upon leaving the Ordnance Department the first of November, he joined the sales force of the National Stove Company Division and will "carry on" with the "Lorain" Oven Heat Regulator and "Direct Action" Gas Ranges.

CHARLES L. HOLMAN, president of the Laclede Gas Light Company, has been elected a member of the board of directors of the Certain-teed Products Corporation at a meeting held Dec. 30, to fill the vacancy created by the death of George L. Edwards last summer. Mr. Holman has been successively secretary, general manager and president of the Laclede Company, and is officer and director of various utility corporations.

E. H. PARRISH, of Atlanta, Ga., has been appointed the Southern representative for the Kompak Company.

E. J. H. Wright, Asst. Sec. of Chicago Company, Dies

E. J. H. Wright, retired assistant secretary of the Peoples Gas Light & Coke Company, died at his home in Chicago, Ill., on Dec. 18, 1919.

Mr. Wright was seventy years of age. He was born in England and came to this country with his parents when he was five years old. He had been a resident of Chicago for sixty-five years. For forty years he was connected with the gas industry here, and retired from active service in June, 1917. Mr. Wright's father also worked for the gas company, and was finally one of its annuitants.

It was as a meter statement taker that Mr. Wright first entered the gas company's employ, and by steady application to business he was promoted to positions of trust and was at different times made manager of various branch offices, vice-president of the Northwestern Gas Company, and finally assistant secretary of the Peoples Gas Light & Coke Company.

FRANK M. ROBERTS, manager of the Haverhill (Mass.) Gas Light Company, has been transferred by the Stone & Webster interests to Keokuk, Iowa, where he will take control of the Stone & Webster properties. The Keokuk properties include a large gas system, electric lighting plant and interurban street railway.

Mr. Roberts will take up his new duties early in February. He went to Haverhill, Mass., a little over seven years ago from Fall River, and it is reported that his services with the Haverhill company have been characterized by a most competent administration and by many improvements that have served to benefit the gas company patrons.

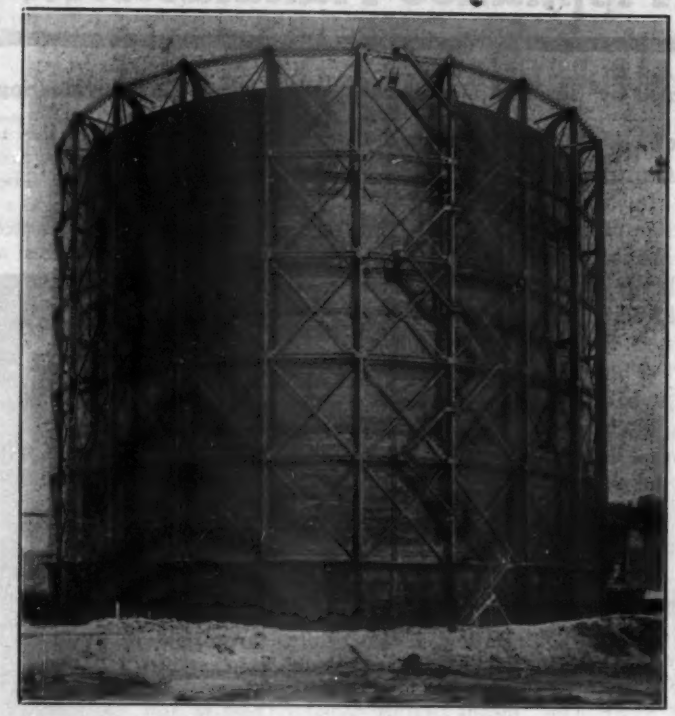
GEORGE L. TAYLOR, member of the A. A. E., has been appointed chief engineer of the Public Service Commission of West Virginia. The commission has jurisdiction over many large gas producing companies and other utilities of a total value of approximately $320,000,000.

EDWARD C. JONES, chief gas engineer of the Pacific Gas & Electric Company, has been elected vice-president of the American Society of Mechanical Engineers.

RITER-CONLEY CO.

PITTSBURGH, PA.

PURIFYING BOXES



STEEL TANKS

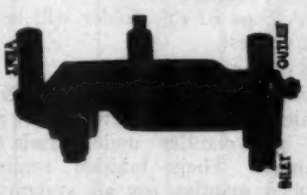
BUILDERS OF

TWENTY YEARS EXPERIENCE **GAS HOLDERS** HAS TAUGHT US HOW

STEEL CONSTRUCTION OF ALL KINDS

Philadelphia Pottstown Detroit Chicago Cincinnati
Washington New York Boston Syracuse San Francisco

HIGH PRESSURE



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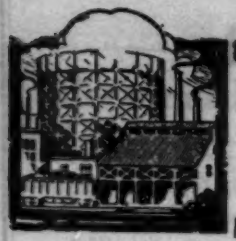
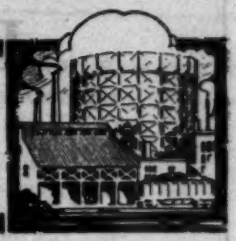


With The Equipment & Appliance Manufacturers



Conducted by Business Department of American Gas Engineering Journal

Coke Bucket

The Western Gas Construction Company, Fort Wayne, Indiana, is making an attractive design of coke bucket which has several appealing advantages. The wheels are large, permitting it to be moved readily, and the bucket itself is hoisted directly out of the cart so as to reduce the amount of load that must be lifted, and, after it has been discharged through a gate at the conical bottom, it is again lowered into the skeleton cart.

A coke bucket gets the hardest kind of wear, not only because of the heavy, gritty substances which it carries, but also because of the type of laborer who usually has it in charge. The buckets are built in two sizes: 11 cu. ft. and 13½ cu. ft. The weight of coal and coke per cubic foot is as follows: Anthracite coal, 55 to 66 lb.; bituminous coal, 50 to 55 lb.; coke, 26 to 30 lb.

WESTERN GAS CONSTRUCTION COMPANY COKE BUCKET

The Western Gas Construction Company states that the demand for this type of bucket is so great that it has entered upon the plan of keeping a stock on hand for quick delivery.

Cabco Radiators for Heating Individual Rooms

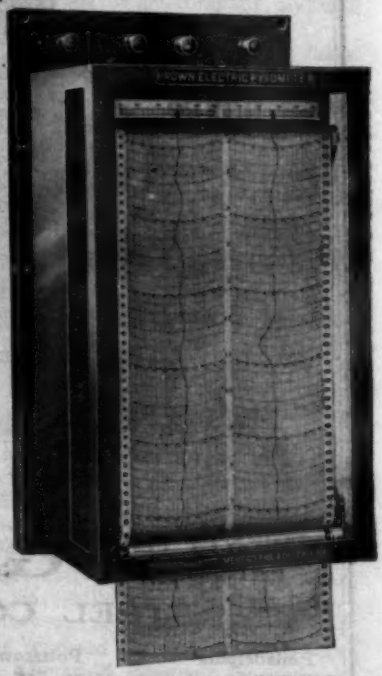
The Cabco Iron Works, Inc., have issued a circular describing the "Cabco" Radiators, which contains a number of satisfied users of their radiators. This heater consists of a series of standard cast-iron radiator sections, equipped with a thermostat valve and air mixer, a Bunsen type burner, an automatic air valve, an automatic safety valve and a water filling plug. The radiator requires no water connection. In starting it, from 6 to 10 quarts of water are poured in the radiator. The water, it is claimed, will last for two weeks without refilling. The action of the radiator is entirely automatic. As soon as six pounds of steam pressure is obtained, the thermostat valve, working automatically, turns down the gas to the amount necessary to maintain that steam pressure. By means of this radiator, heat in any single room of the building is provided as desired. The Cabco Iron Works, Inc., also manufacture garage radiators, as well as castings for all makes of radiators.

Uniform Temperature in Your Superheater Saves Waste of Fuel and Oil

The Brown Instrument Company, Philadelphia, Pa., have issued a folder, entitled "How Gas Plants Watch Production To-day." It contains a large illustration of one of the superheaters of the Consumers Gas Company, Reading, Pa., showing installation of the thermo-couple with the compensating leads extending into the cold well ten feet in the ground.

The illustration shows the Brown Duplex Recording Pyrometer. This instrument produces two records on one chart, side by side, for instant comparison.

It is well known that a temperature of 1,300 to 1,350 deg. Fahr. in the superheater will give the greatest possible production per pound of fuel and gallon of oil, and that a deviation from this temperature means a setback in production and also useless waste. The value of this instrument to the gas company is that the operators can keep a close check on temperatures and can thus avoid all leaks. The only attention necessary is to wind the double barrelled clock once a week.



BROWN DUPLEX RECORDING PYROMETER

A copy of this folder will be sent on request.

Messrs. Albert Scheidegger & Co., Bale, Switzerland, manufacture a line of gas mantles under trade-mark names. Their braided ramie-silk ribbed mantles for all systems are called the "Koh-I-Noor," and the knitted mantles, "Edelweiss-Perfect." They also manufacture the "Faultless" Patent-Mantleholders. They announce that they are now prepared to fill orders from the United States and Canada.